

Section I (Statement of the Claims)

A listing of claims 1-24 of the application is set out below. No claims amendments have been made herewith.

1. (Previously presented) An abrasive composed of an inorganic metal powder that contains at least one of boron, aluminum and titanium, and meets all the following conditions:
 - (1) its true specific gravity is 4 g/cm^3 or more;
 - (2) its average particle diameter is from $5 \text{ }\mu\text{m}$ to $50 \text{ }\mu\text{m}$ inclusive;
 - (3) its maximum particle size is $100 \text{ }\mu\text{m}$ or less;
 - (4) its hardness (HMV) is from 110 to 340 inclusive,with the proviso that when the inorganic metal powder contains titanium in the absence of boron and aluminum, the inorganic metal powder further contains silicon in an amount of at least 0.7 wt%.
2. (Previously presented) The abrasive according to claim 1, wherein the average particle diameter of the inorganic metal powder is from $10 \text{ }\mu\text{m}$ to $30 \text{ }\mu\text{m}$ inclusive.
3. (Previously presented) The abrasive according to claim 1 or 2, wherein the maximum particle size of the inorganic metal powder is $80 \text{ }\mu\text{m}$ or less.
4. (Previously presented) The abrasive according to claim 1, wherein the inorganic metal powder contains at least one of boron and aluminum, in amounts of not more than 1.5 wt% boron and not more than 0.1 wt% aluminum.
5. (Original) The abrasive according to claim 4, wherein the principal component of the metal powder is iron or an iron-based alloy and the metal powder contains not more than 0.1 wt% aluminum and not more than 0.1 wt% titanium.
6. (Original) The abrasive according to claim 5, wherein the metal powder is stainless steel containing not less than 8 wt% chromium.
7. (Original) The abrasive according to claim 5, wherein the metal powder is stainless steel containing not more than 1.5 wt% boron.

8. (Previously presented) The abrasive according to claim 1, wherein the metal powder has a tap density in a range of from 4.3 g/cm³ to 4.8 g/cm³ inclusive.
9. (Previously presented) The abrasive according to claim 1, wherein 0.01 wt% to 5 wt% of a substance providing fluidity and resistance to moisture absorption is mixed in 100 wt% of the inorganic metal powder.
10. (Previously presented) The abrasive according to claim 1, wherein a substance providing fluidity and resistance to moisture absorption is attached to a part of or the entire surface of the inorganic metal powder in the proportions of 0.01 wt% to 5 wt% of the substance to 100 wt% of the inorganic metal powder.
11. (Previously presented) The abrasive according to claim 10, wherein the substance comprises a material selected from the group consisting of stearic acid and anhydrous silica.
12. (Withdrawn) An abrasive manufacturing method comprising the steps of:
causing molten inorganic metal contained in a tundish including an ejecting nozzle to eject from the ejecting nozzle, wherein the metal contains at least one of boron, aluminum and titanium, with the proviso that when the molten inorganic metal contains titanium in the absence of boron and aluminum, the molten inorganic metal further contains silicon in an amount of at least 0.7 wt%; and
ejecting a high-pressure fluid onto the molten metal ejected from the ejecting nozzle in such a manner that the high-pressure fluid will form a generally conical shape, which converges downwards, and will surround the molten metal, thereby powdering the molten metal;
wherein the angle of a vertex of the generally conical shape that is formed by ejection of the high-pressure fluid is set between not less than 10 degrees and less than 30 degrees.
13. (Withdrawn) The abrasive manufacturing method according to claim 12, wherein the angle of a vertex of the generally conical shape that is formed by ejection of the high-pressure fluid is set from 15 degrees to 25 degrees inclusive.

14. (Withdrawn) The abrasive manufacturing method according to claim 12, wherein the angle of a vertex of the generally conical shape that is formed by ejection of the high-pressure fluid is set to 20 degrees.
15. (Withdrawn) The abrasive manufacturing method according to any one of claims 12 to 15, further comprising the step of heating the tundish.
16. (Withdrawn) The abrasive manufacturing method according to claim 15, wherein the tundish is heated so that the temperature of the molten metal ejected from the ejecting nozzle will be between 1600 °C and 1700 °C inclusive.
17. (Withdrawn) The abrasive manufacturing method according to claim 12, wherein as the molten metal, a raw material is used whose principal component is iron or an iron-based alloy, and which contains carbon in the range of 0.060 wt% to 0.070 wt% inclusive, and to which no aluminum or titanium is added.
18. (Withdrawn) An abrasive manufacturing device comprising:
a tundish for containing molten metal;
an ejecting nozzle mounted on the tundish to cause the molten metal contained in the tundish to eject out; and
an atomizing nozzle for ejecting a high-pressure fluid onto the molten metal ejected from the ejecting nozzle in such a manner that the high-pressure fluid will form a generally conical shape, which converges downwards, and will surround the molten metal;
wherein the atomizing nozzle causes a high-pressure fluid to eject so that the angle of a vertex of the generally conical shape that is formed by ejection of the high-pressure fluid will be between not less than 10 degrees and less than 30 degrees.
19. (Withdrawn) The abrasive manufacturing device according to claim 18, wherein the atomizing nozzle causes the high-pressure fluid to eject so that the angle of a vertex of the generally conical shape that is formed by ejection of the high-pressure fluid will be from 15 degrees to 25 degrees inclusive.

20. (Withdrawn) The abrasive manufacturing device according to claim 18, wherein the atomizing nozzle causes the high-pressure fluid to eject so that the angle of a vertex of the generally conical shape that is formed by ejection of the high-pressure fluid will be 20 degrees.

21. (Withdrawn) The abrasive manufacturing device according to any one of claims 18 to 20, further comprising a heater for heating the tundish.

22. (Withdrawn) The abrasive manufacturing device according to claim 21, wherein the heater heats the tundish so that the temperature of the molten metal ejected from the ejecting nozzle will be between 1600°C and 1700 °C inclusive.

23. (Previously presented) An abrasive manufactured by an abrasive manufacturing method comprising the steps of:

causing molten inorganic metal containing at least one of boron, aluminum and titanium contained in a tundish including an ejecting nozzle to eject from the ejecting nozzle, with the proviso that when the molten inorganic metal contains titanium in the absence of boron and aluminum, the molten inorganic metal further contains silicon in an amount of at least 0.7 wt%; and

ejecting a pressurized fluid onto the molten metal ejected from the ejecting nozzle in such a manner that the pressurized fluid will form a conical shape, which converges downwards, and will surround the molten metal, thereby powdering the molten metal;

wherein the conical shape that is formed by ejection of the pressurized fluid has a vertex angle that is set between not less than 10 degrees and less than 30 degrees.

24. (Previously presented) An abrasive manufactured by a method including use of an abrasive manufacturing device, said abrasive comprising an inorganic metal powder containing at least one of boron, aluminum and titanium, with the proviso that when the inorganic metal powder contains titanium in the absence of boron and aluminum, the inorganic metal powder further contains silicon in an amount of at least 0.7 wt%, said inorganic metal powder having (i) a true specific gravity of at least 4 g/cm³, (ii) an average particle diameter in a range of from 5µm to 50 µm inclusive, (iii) a maximum particle size not exceeding 100 µm, and (iv) an HMV hardness in a range of from 110 to 340 inclusive, said method comprising :

(1) providing said abrasive manufacturing device, comprising:

a tundish for containing molten metal containing at least one of boron, aluminum and titanium;

an ejecting nozzle mounted on the tundish to cause the molten metal contained in the tundish to eject out; and

an atomizing nozzle for ejecting a pressurized fluid onto the molten metal ejected from the ejecting nozzle in such a manner that the pressurized fluid will form a conical shape, which converges downwards, and will surround the molten metal;

wherein the atomizing nozzle causes the pressurized fluid to eject so that the conical shape that is formed by ejection of the pressurized fluid has a vertex angle that is between not less than 10 degrees and less than 30 degrees;

(2) causing said molten metal to eject from the ejecting nozzle;

(3) ejecting said pressurized fluid onto the molten metal ejected from the ejecting nozzle to surround and powder the molten metal, thereby forming said abrasive.